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Lessons Learned in Development of NAMAs for Biogas in Vietnam

The AILEG Project

Contract No. EEM-I-00-07-00004-00
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Background on NAMAs

Nationally Appropriate Mitigation Actions (NAMAs) are a key tool for developing countries to structure, promote and obtain international support for their potential low emission development strategies (LEDS) under the United Nations Framework Convention on Climate Change (UNFCCC). The guidance and procedures for the crediting of NAMAs is still being negotiated at the UN level, but NAMAs are expected to significantly reduce greenhouse (GHG) emissions compared with business-as-usual (BAU) where no additional low-emission development strategies are implemented. NAMAs must also:

- Take into account sustainable development priorities and strategies;
- Be nationally determined and fit within the respective capabilities and social and economic conditions of each country;
- Be implemented in a manner that is measurable, verifiable and reportable; and
- Be country-driven and sponsored solely from within a country and/or supported by international technology, financing, or capacity building.

Characteristics of a Nationally Appropriate Mitigation Action (NAMA)

The scope can vary widely, including:

- Economy-wide goals or targets based on emissions, intensity, or a technology
- Sectoral goals or targets
- Cross-cutting policies, such as renewable portfolio standards or feed-in tariffs
- Regulatory, institutional, and financial reforms
- Financing mechanisms, such as a revolving fund
- Individual projects

International support for actions that meet the above requirements can be obtained from the private sector, bilateral funds, development banks, or the Green Climate Fund. Key challenges to successfully developing NAMAs include identifying actions that are transformational, make significant contributions to low-emission development, and meet capacity of affected stakeholders to implement and monitor the NAMA. Since there is strong competition among developing countries for international support, NAMAs that are well-defined, offer clear GHG reductions and co-benefits, and are measurable and verifiable will have a better chance of attracting investment.

The Case for Biogas NAMAs in Vietnam

Increasing biogas production is an attractive option for NAMAs in Vietnam due to the potential emission reductions from using livestock waste for energy. The Government of Vietnam (GVN) has expressed a keen interest in developing NAMAs for biogas due to the employment, environmental, and economic benefits expected from this technology. Increased adoption of biogas would support the government's goal of reducing GHG emissions from agriculture by 20 percent before 2020. In 2010, the GHG emissions from agriculture were estimated at 88 million tCO2e, or 33.20 percent of total emissions, second only to the energy sector.[1] Most of these emissions come from rice production (50 percent),

[1] The Initial Biennial Updated Report of Viet Nam to the United Nations Framework Convention on Climate Change, December 2014 http://unfccc.int/resource/docs/natc/vnmbur1.pdf. The sectors include: energy, industrial processes, agriculture, waste, land use and forestry, and bunker fuels. Accessed April 2015.

followed by agricultural soils (27 percent) and animal husbandry (21 percent). As a result, activities that reduce emissions from agriculture could have a significant impact on overall emissions.

The Status of Biogas in Vietnam

The use of biogas in Vietnam's agriculture sector is growing, particularly in the household sector. The Ministry of Agriculture and Rural Development (MARD) is implementing a program to incentivize small-scale biogas[2] in 18 towns across Vietnam and plans to replicate this program to include 52 of the total 64 provinces in the country. Moreover, through the Netherlands Development Agency's (SNV) support for the National Biogas Programme, over 140,000 household-scale biogas digesters with an average volume of 10 m^3 have been installed in the country.[3] More than 99 percent of the targeted households received a subsidy from the biogas program, which on average covered 49 percent of the construction cost of the biodigesters through loans and/or subsidies and provided technical, financial and training support once the digesters were installed, With an estimated payback of 3.5 years for a family digester and continued incentives from MARD and international partners such as SNV, the number of small-scale digesters is expected to grow to 560,000 by 2030.

Barriers to adoption in the household sector still remain: 1) lack of large appliances capable of using biogas, 2) inability to manufacture appliances and digesters locally, 3) limited awareness of available slurry applications (digestate), 4) accessibility of biogas feedstocks, 5) minimal coordination between ministries and donors, 6) lack of technical skills to install and maintain digesters in the private sector, and 7) disparities in biogas potential across sub-sectors. In addition, uncertainties remain as to the amount of GHG emissions actually reduced through this option as methane gas from household digesters is often released to the atmosphere when supply exceeds demand. One recent pilot survey conducted by the AILEG project in the An Giang and Thai Binh provinces indicates that 75 - 88 percent of the biogas captured by household digesters could be released due to excess supply, limited opportunity to resell the biogas, and lack of knowledge of the importance of flaring rather than venting excess gas.[4]

While small-scale biogas is prevalent and growing in Vietnam, medium- and large-scale biogas is nascent due to high capital, maintenance and operating costs, lack of effective domestic technologies, limited availability of start-up capital, dispersed livestock farms which limits opportunities for large centralized digesters, the absence of an established market for livestock digestate, and difficulties in treating wastewater from biogas production. In 2011, Vietnam had over 27,000 medium- to large-scale livestock farms, defined as farms with more than 300 animals. This number is growing due to a general shift away from small-holder farming. However, the adoption of biodigesters on these farms has been very limited, with less than 0.5 percent use.[5] Significant barriers would have to be overcome to increase the level of

[2] Note: Small-scale = farms with < 300 animals; medium-scale = farms with 300-2000 animals; large-scale = farms with >2000 animals

[3] Biogas User Survey 2010-2011: Biogas Development Program for Livestock Sector in Vietnam 2007-2012. MARD and SNV, June 2011, http://www.snvworld.org/files/publications/biogas_user_survey_vietnam_2010-2011.pdf

[4] Vietnam Data Collection to Support LEDS for the Agriculture Sector: The AILEG Project. USAID, October 2013.

[5] Livestock Methane Capture and Electricity Production in Vietnam: Status, feasibility, economics, and potential. The AILEG Project. USAID, October 2013

deployment, as current studies indicate medium and large digesters are capital intensive and require a high degree of technical management, making other renewable energy sources more competitive as a source of electricity generation in Vietnam.[6] Overcoming these barriers would require significant finance, technical assistance, education, and legal and regulatory support.

Given these barriers to deployment, a NAMA supporting biogas development in Vietnam would need to be designed right to have a measurable impact on emissions, including by differentiating by farm size and type of barrier. Given the existing uptake of small-scale digesters in the BAU, the potential for achieving additional emission reductions may be greatest for medium- to large-scale livestock farms if and when the technical and financial hurdles can be overcome. In the household sector, the NAMA should be designed to clearly accelerate current growth in biodigesters in order to lead to a deviation in BAU emissions.

Next Steps and Recommendations for NAMA Development

The design of NAMAs can be a lengthy process, involving several steps in addition to simply estimating the potential GHG emission reductions from implementing the proposing action. The following are some of the issues and design elements the GVN should address for NAMAs relating to biogas from livestock waste.

Targeting Sectors and Technologies

An early step in NAMA design involves deciding on the specific sector, technology, or process to promote. The GVN has already identified biogas from livestock waste as a key focus for NAMAs. However, it may want to focus on medium-sized livestock farms where the potential for large-scale application of digesters is high. SNV recently introduced a program to pilot medium-sized digesters which MARD could build upon.[7] Alternatively, to take advantage of opportunities of scale that can be achieved by promoting biogas across a larger set of applications, the GVN may want to expand the NAMA to also include biogas facilities for agro-industries and wastewater in regions where there is sufficient demand for the associated energy. A larger market for biogas digesters may increase opportunities for attracting investment in domestic production and installation of the units.

Implementation Policies and Measures

NAMAs to promote biogas development can be developed at several levels, including design of an overall development strategy for biogas or a subset of the potential market for the technology. NAMAs could also address specific policies, technologies, projects, or barriers to financing.

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[6] Livestock Methane Capture and Electricity Production in Vietnam: Status, feasibility, economics, and potential. The AILEG Project. USAID, October 2013

[7] SNV. The Vietnam Domestic Biogas Programme, http://www.snvworld.org/en/countries/vietnam/our-work/programmes/renewable-energy, Accessed April 2015.

Stakeholder Involvement

Many of the NAMAs being considered in Vietnam and elsewhere are much broader in scale than the Clean Development Mechanism (CDM) projects credited under the Kyoto Protocol. As a result, their development and implementation involves a much larger set of stakeholders than typically involved in mitigation actions. To design effective NAMAs it is important to build in enough time to consult with key stakeholders. For a NAMA promoting biogas, it would be important to include MARD, the Ministry of Natural Resources and Environment (MONRE), the Ministry of Construction, the Ministry of Transportation, Ministry of Investment and Planning, and the Ministry of Finance. In addition, various local and provincial agencies in the agriculture sector would need to be involved, as well as the research community for the development and testing of new technologies that address specific climate and feedstock characteristics in Vietnam. The private sector should also be consulted for determining best practices for mobilizing investment in new technology development, developing the technical workforce, and for setting up test facilities.

Estimating Time Needed for Preparation and Implementation

As part of the plan for attracting resources into the design and implementation of a NAMA, it is important to determine how long it will take to institutionalize and begin implementing the action, including changing laws and regulations and raising the necessary funding. For example, if the GVN wants to modify the existing feed-in-tariff to create additional incentives for electricity generated from biogas, it should set a time schedule for going through this process. This will be helpful for determining how much research will be needed for supporting NAMA design versus implementation.

Estimating GHG Emission Reductions and Years

A key element in the design of a NAMA is estimating GHG emissions reduced or avoided by the proposed action for the BAU and project scenarios. This includes demonstrating that potential leakage or double counting has been assessed. For example, if MARD has already invested significant resources in promoting household-scale biogas, these activities should be incorporated in the BAU. Similarly, existing incentives (such as the feed-in-tariff and the MARD/SNV incentives for household digesters) should be included in the BAU. Depending on the scale of the policy or action included, the GVN may need to model long-term impacts on electricity generation or fuel mix. It will be important to show captured biogas is actually used for energy and not released to the atmosphere at times of excess demand. For household-scale biogas, the GVN will need to conduct further surveys and/or set up monitoring protocols for tracking use over time.

Sustainable Development Impacts

NAMAs should support the sustainable development priorities and strategies of the country. NAMAs that clearly demonstrate measurable, verifiable and reportable benefits are likely to attract more international financing. Example metrics to track for biogas include indoor air quality, household income, water quality, employment, by-products, and energy or electricity generated.

Estimating the Cost of the NAMA

A realistic assessment of the implementation and net total costs of designing and implementing a NAMA is important. The analysis should include the cost of each individual element.

Domestic and International Resources Committed

The GVN will need to determine how much of the NAMA costs can be covered by domestic versus international resources. Since developed countries are likely to fund NAMA elements that have real and measurable GHG emission benefits, the GVN may want to direct its internal resources toward elements with harder to quantify benefits. For biogas, domestic funding could be directed to training and education or piloting of technologies.

International Assistance Sought and Impact on Level of Ambition

Three types of support can be provided for NAMAs, including capacity building, technology transfer, and finance. All three categories of support may be relevant for a biogas NAMA. For example, financing could be requested for setting up a revolving loan fund. Capacity building may be needed for the design of institutions and regulations that increase incentives for technology adoption and use. Technology transfer support could be requested to gain experience with international biogas digesters for large- and medium-size farms since these technologies are not currently available in Vietnam.

Measurement, Monitoring and Verification

Development of an effective measurement, monitoring, and verification protocol for tracking the GHG and sustainable development benefits of the NAMA is crucial. Most international investors and funds have strict requirements for demonstrating real and measurable results of their investments. This is an area where there is little broadly applicable guidance since monitoring criteria vary among investors. Emerging protocols developed by organizations such as the World Resources Institute (WRI) are beginning to provide more guidance in this area.